QUANTIFICATION OF FLUORESCENCE FROM THE LYMAN-ALPHA PHOTOLYSIS OF WATER FOR SPACECRAFT PLUME CHARACTERIZATION.

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A quantified characterization of a spacecraft's thruster plume is achievable through measurements of fluorescence from the plume. Fluorescence is present in a spacecraft's plume due to electronic excitation from solar photons, primarily Lyman-alpha (121.6 nm). Excitation of water with Lyman-alpha leads to photodissociation through four possible channels, one of which produces fluorescent hydroxyl radicals (OH(A)). Dependent on the rovbirational state, this species is either predissociative or fluorescent. Here, dispersed fluorescence from water photolysis at Lyman-alpha has been recorded. Comparing our current florescent data with previous H-atom Rydberg tagging results, the ratio of predissociation to fluorescence of OH(A) is quantified.